

false ova we regard as the less justifiable because, according to our observation already communicated, the development of the embryo also takes place in the winter ova without previous fecundation by the male.

Of course our opinion will lose nothing, even should it in time be proved that no evolution takes place without fecundation in the animal kingdom, *i. e.* that the cases of parthenogenesis and pædogenesis are only cases of self-fecundation.

It will not be superfluous to remark here, that in my judgment the fate of the parthenogenesis of plants awaits the theory of the agamic reproduction of some animals. As in the former case the parthenogenesis set up by Radlkofer and Alex. Braun has been brought down to the grade of ordinary hermaphroditism by the investigations of Regel, Karsten, De Bary, Schenk, and many others, so also it will probably be proved for the animal kingdom that some parts of the ovary produce spermatozoa instead of ova—which, indeed, may very easily be possible, as the ovary and the testis are originally perfectly similar structures.

Not long since I learned that H. Balbiani is now publishing his memoir upon the Aphides, in which he endeavours to demonstrate the hermaphroditism of those insects; and thus the supposition above expressed is already confirmed. Unfortunately I have been unable to make myself acquainted with this work.

[To be continued.]

V.—*Contributions to the Fauna of the Upper Tertiaries.*
No. I. *The "Mud-deposit" at Selsey, Sussex.* By ALFRED BELL.

IT is now some twenty years since Mr. Dixon, of Worthing, called the attention of geologists to a superficial deposit upon the sea-shore of the Sussex coast, near Selsey, eight miles south of Chichester, to which he gave the name of "mud-deposit." This deposit was afterwards fully described by Mr. Godwin-Austen in a paper upon the Newer Tertiary Deposits of the Sussex Coast, read before the Geological Society and published in their 'Quarterly Journal,' 1857. Both these gentlemen gave lists of fossils; but, owing to unfavourable circumstances, the beds or scattered patches being very inaccessible, and only workable at low tides, the lists only enumerate about forty-five species of various organisms. Some

favourable opportunities presenting themselves last summer and autumn, I was enabled to add materially to these lists; and as the results *prove* the deposit to be unique as regards the fauna (which, as pointed out by the above gentlemen, had a southern facies), a detailed description of the whole may not be unworthy of a place in the 'Annals and Magazine of Natural History,' prefaced by a few words indicative of the position of the deposit itself.

Seldom visible, it extends in patches along the shore of the Selsey peninsula, from Bracklesham to Pagham, with a slight extension inland and a greater one seawards. It is capped by a clay full of ice-borne boulders of all sizes and formations, some of them being of French origin, others of the far west of England (none of these, as far as I can find, bear traces of the striæ so common on rocks of the true glacial period). This in turn is overlain by a water-worn gravel containing marine or estuarine shells, corresponding in age to the "elephant-gravel" of Dr. Mantell. Above this is a deposit of Löss, the ordinary vegetable soil covering all. Speaking of the Löss, I may say, *par parenthèse*, that many English geologists confound this with ordinary fluvial deposits, forgetting that the Löss may be identified by its fauna, which is purely terrestrial; and, judged by this standard, the only English localities for this deposit are the present, which reaches nearly to the Goodwood Hills, some patches in the Medway gravels, and another on the shore at Swale Cliff, near Herne Bay.

The Mud-deposit itself is composed of a grey sandy mud, full of organisms and small stones, and, when last seen by myself, was covered by a layer of bright-yellow sand, and that again by the ordinary rolled shingle and sand of the shore. It was only by digging through this that I could reach the bed below half-tide.

The presence of a large river having access to the bay or estuary would account for the mammals, land-shells, pieces of wood, &c. found intermixed with the marine remains.

Of the 140 shells, 30 do not exist nearer than the west of England, the Channel Islands, or North Spain, 6 or 8 not passing this side of Gibraltar, all being littoral (or sublittoral) species. As British quaternary fossils, 42 are peculiar to Selsey (unless otherwise mentioned), and 20 others probably find here their earliest place in British geological history.

The recent South-European forms are marked †, the peculiar Selsey fossils *.

List of Fossils from the Selsey "Mud-deposit."

MAMMALIA.

Elephas antiquus, Falc.
 — *primigenius*, Blum.
Equus caballus, L.
Bos, sp.
Cervus elaphus, L.
Capra hircus?, Gmel.

PISCES.

Otolites, three species, of doubtful origin.

CRUSTACEA.

Carcinus Mænas, L.
Pagurus Bernhardus, L.
Bairdia, sp.
Balanus crenatus, Brug.
Verruca Stromia, Müll.

MOLLUSCA.

Anomia ephippium, L. (small).
Ostrea edulis, L.
 — —, var. *parasitica*, Turt.
Pecten maximus, L. (valves united).
 — *opercularis*.
 †* — —, var. *Audouinii* (very rare). *Hab.* S. Europe.
 †* — *polymorphus*, Bronn (with valves united). *Hab.* Portugal and S. Europe.
 — *tigrinus*, Penn. (one valve).
 — *varius*, L.
Mytilus edulis, L.
 — *ungulatus*, L.
Modiolaria discors, L. (one valve).
Nucula nucleus, L.
 — —, var. *radiata*, Hanl.
Lepton nitidum, Turt.
Montacuta bidentata, Turt.
 * *Lasea rubra*, Mont.
Kellia suborbicularis, Mont.
Cardium edule, L.
 — *exiguum*, Gmel.
 — *echinatum*, L.
 — *fasciatum*, Mont.

- Cardium nodosum*, Turt.
 *—— *papillosum*, Poli. Nearest habitat, Channel Islands.
 —— *tuberculatum*, L.
Lucina borealis, L.
 **Loripes lacteus*, L.
Axinus flexuosus, Mont.
 **Diplodonta rotundata*, Mont.
Cyamium minutum, Fabr. Lochaber and Belfast are the only recorded localities for the fossil shell.
Cytherea chione, L. And in the Macclesfield Drift.
Venus ovata, Penn.
 —— *verrucosa*, L.
Tapes aureus, Gmel. Also an Irish fossil.
 *—— —, var. *quadrata*, Jeffr.
 —— *decussatus*, L. (very large, with valves united).
 —— *pullastra*, W. Wood.
 —— *virginea*, L.
Tellina balthica, L.
 **Gastrana fragilis*, L. (double, and excessively rare).
Mactra stultorum, L.
 —— *subtruncata*, Da C.
Lutraria elliptica, Lam.
 —— *oblonga*, Chemn.
 †*—— *rugosa*, Chemn. (valves united, but rarely found).
 Range: Portugal to Tunis, Canary Islands.
Scrobicularia piperita, Gmel.
Syndosmya alba, W. Wood.
 *—— *tenuis*, Mont.
Solen siliqua, L.
 *—— *vagina*, L. (*in situ*, very finely preserved).
 **Pandora inaequalis*, var. *rostrata*, Leach. The Channel Islands is the nearest locality for the recent shell.
Corbula gibba, Olivi.
Mya arenaria, L. (Dixon).
 —— *truncata*, L. (occasionally with the siphons partially preserved).
Saxicava rugosa, L.
Pholas candida, L.
 —— *crispata*, L. Enormously large: one has been met with 6 inches in breadth. The nearest in size I have seen to this monster is from the Belfast Clay, measuring $4\frac{1}{2}$ inches. It is not known to attain this size now.
 —— *dactylus*, L. (double, and very large).

Helix hispida, L.
 —— *nemoralis*, L., and var. *hortensis*, Müll.

- **Dischides Olivi*, Scacchi (very rare). Ranges from Gascony to Teneriffe and the Mediterranean Sea.
- †**Dentalium dentalis*, L. (moderately common, but small).
Hab. West France to the Canaries and the Ægean Sea.
 — *tarentinum*, Lam.
- **Chiton fascicularis*, L.
 *—— *discrepans*, Bronn. Nearest habitat, Cornwall.
 *—— *marginatus*, Penn.
- †*—— *siculus*, Gray. Range, Cadiz to the Ægean Sea.
Patella vulgata, L.
Tectura virginea, Müll.
Fissurella græca, L.
- †*—— *costaria*, Grat. (= *F. neglecta*, Desh.). Range: South France and the Mediterranean Sea.
Trochus cinerarius, L. (abundant).
 *—— *exasperatus*, Pult. Sir H. James records it from Wexford.
 — *lineatus*, Da Costa. I only know it from Barnstaple. The Scotch localities are doubtful.
 — *magus*, L. Adult shells scarce, young shells plentiful. I have not met with a description of the young shell, which loses some of its characters as it approaches maturity, and therefore give one:—
 Shell depressed; whorls 4-5, flatly convex, with close-set spiral ridges, the two at the base of each whorl being stronger than the others, and forming a deep suture as it increases in size, the whole intersected by fine striæ, which are more developed between the ridges, and most of all so within the two just referred to. The interior is nacreous, and the umbilicus small.
- *—— *striatus*, L. (very rare).
 — *tumidus*, Mont.
 — *umbilicatus*, Mont.
 — *ziziphinus*, L.
- **Phasianella pullus*, L. I have seen it in an Irish deposit, but from no other English formation than at Selsey; very plentiful and bright-coloured.
Lacuna puteolus, Turton.
 — *pallidula*, Da Costa.
Littorina littorea, L.
 — *obtusata*, L.
 — *neritoides*, L.
 — *rudis*, L. All very common.
 — —, var. *nigrolineata*, Phil.
 — —, „ *saxatilis*, Johnst.
 — —, „ *tenebrosa*, Mont. The colour in this va-
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riety is exceedingly well preserved, as, indeed, it is in all the species into which red or purple enters as part of the colouring. *Pecten polymorphus*, *Phasianella*, *Pleurotoma lævigata*, and some of the *Trochi* may serve for examples.

Hydrobia ulvæ, Penn., and var. *subumbilicata*, Mont.

(*Assimineæ Grayana*, Leach (?). On the authority of Mr. Sowerby. I have not seen it.)

†**Rissoa cimex*, L. (moderately common). Ranges from South Spain to the Ægean Sea.

—— *costata*, Adams.

*—— *costulata*, Alder.

*—— *lactea*, Michaud. Nearest habitat, Channel Islands.

“Our rarest *Rissoa*,” Jeffr.

—— *membranacea*, Adams.

*—— —, var. *venusta*, Phil.

*—— —, var. *elata*, Phil.

—— *parva*, Da Costa, and var. *interrupta*, Adams.

*—— *punctura*, Mont. (Jeffreys).

—— *striata*, Adams.

—— *striatula*, Mont. There are but two other localities in Britain recorded for this exquisite shell,—Largs and Lochgilphead.

Turritella terebra, L. (non Lam.) = *T. communis*, Risso.

Scalaria communis, Lam. (very rare).

**Aclis unica*, Mont.

Odostomia acuta, Jeffr.

—— *conoidea*, Broc.

—— *pallida*, Mont.

—— *plicata*, Mont.

*—— (*Chemnitzia*) *lactea*, L. Is also a Belfast fossil.

—— (——) *indistincta*, Mont.

*—— (——) *suturalis*, Phil.

*—— (——) *rufa*, Phil.

Natica catena, Da Costa.

—— *Alderii*, E. F.

**Adeorbis subcarinatus*, Mont. Is also an Irish fossil.

Cerithium reticulatum, Da Costa.

Purpura lapillus, L.

Buccinum undatum, L.

Nassa incrassata, Ström.

—— *reticulata*, L.

*—— *nitida*, Jeffr.

Murex erinaceus, L.

**Lachesis minima*, Mont. Much larger than the recent British forms.

**Defrancia reticulata*, Renier.

†**Pleurotoma Bertrandi*, Payr. Ranges from South France to the Morea.

*—— *laevigata*, Phil. This is the typical form, which is not found living north of the Channel Islands. It is a rare fossil.

—— *rufa*, Mont. (moderately common).

*—— —, var. *semicostata*, Jeffr. *Hab.* Channel Islands.

—— *turricula*, Mont.

Cypræa europæa, Mont.

Utriculus truncatulus, Brug.

—— *obtusus*, Mont.

*—— *Lajonkairiana*, Bast.

**Bulla hydatis*, L. (fragments only).

**Conovulus bidentatus*, Mont.

RHIZOPODA.

Cornuspira foliaceus, Phil.

Biloculina, sp.

ECHINODERMATA.

Echinocyamus pusillus.

Spatangus purpureus.

VI.—On the American Eider Duck. By R. B. SHARPE, F.L.S. &c., Librarian to the Zoological Society of London.

SOME time ago I received a hint from Mr. D. G. Elliot, so well known for his great work on the Birds of North America, that the Eider Duck of Europe was not identical with the Eider of America, although both species had, from the time of Linnaeus, been united under the name of *Somateria mollissima*. Mr. J. H. Gurney also wrote to me independently on the same subject; and having had occasion to examine the matter when writing the history of the Eider Duck for the 'Birds of Europe,' I find that the surmise of both Mr. Elliot and Mr. Gurney is correct, and that the American *Somateria* is not the same as the European species. To begin with, the American Eider Duck is a very much finer bird than its European congener, and both male and female have the sickle-shaped inner secondaries more fully developed. The chief difference, however, lies in the bill, the form of which in each species is illustrated by the accompanying woodcuts.

From these it will be seen that in *Somateria Dresseri*, as I propose to name the American bird, the bare ridges running up from the nostril to the eye are very much broader, and also differ in being distinctly rugose. Again, the sea-green